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December 4, 1948

SCIENCE NEWS LETTER

DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Magnetic Lines

See Page 360

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AERONAUTICS

Supersonic Air Transport

A future supersonic transport which would compete with other forms of transportation economically, was reported feasible by a scientist.

➤ WEIGHT for weight, a future supersonic transport plane flying at high altitudes will give as many miles per gallon of fuel as your automobile, the National Academy of Sciences was told in Berkeley, Calif.

Robert T. Jones of the Ames Aeronautical Laboratory of the National Advisory Committee for Aeronautics took issue with opinions that flight faster than sound will be "excessively wasteful." He declared that aerodynamic theory of slender plane bodies and wings indicates that supersonic flight will be competing with other forms of transportation economically.

The plane which Mr. Jones envisions as a future supersonic transport would carry a conventional load at an altitude of 60,000 feet. Design requirements of such a plane would enable it to fly slowly enough at low altitudes for landing.

Using present turbojet engines, this plane would give a fuel economy in miles-per-gallon that would "not fall far short of that achieved by other forms of transportation," Mr. Jones' studies indicate. The comparison was made on the basis of weight in relation to fuel requirements.

The supersonic plane would be much like today's air transports in many respects, but it would use sweepback wings to reduce the drag which results from going faster than the speed of sound. This type of wing is now incorporated on some high speed planes, as is the very slender body which the future supersonic craft would have.

When such a transport will be available, Mr. Jones did not estimate. But when it is flying, it will compete economically with other forms of transportation, he concluded.

Science News Letter, December 4, 1948

MEDICINE

Causes for King's Ill

➤ IMPAIRED BLOOD circulation to the legs from which the King of England is reported suffering, may arise from many different causes. Among them are infection, injury, heart disease and diabetes. Hardening of the arteries is another and a common cause of impaired circulation.

In artery hardening, the walls of the blood vessels thicken and lose elasticity. As a result, the lumen of the artery, corresponding to the bore of a hollow tube, becomes smaller and smaller. If it is entirely closed by this process, no blood can get through to nourish the tissues of that part.

This artery hardening condition, together with the blood vessel disease called thromboangiitis obliterans, or Buerger's disease, make up almost 95% of all cases of disease of the blood vessels of the extremities, according to one authority.

The probable outcome depends to some extent on whether arteries or veins are affected. For example, if the veins are affected, the great danger is that of a clot breaking loose and making its way to the heart or lungs where it may become fatal. If the arteries are involved, the consequent lack of blood supply may cause gangrene and the loss of a limb.

Pain is the most common symptom of diseases of the blood vessels of the extremities. The pain may range from a mild "gnawing" to excruciating. Weakness and fatigue of the affected limb are also common. Patients often have sensations of tingling and "pins and needles," or they may complain of numbness.

Treatment for these blood vessel diseases varies according to the condition. Tobacco is usually forbidden though alcohol may in some cases be allowed and even encouraged. Surgery, various drugs and physical therapy may be used. For clots, doctors in some cases use two relatively new anti-blood clotting drugs, heparin and dicumarol.

Radioactive tracer chemicals and fluorescent dyes are being used fairly widely to study the circulation through veins and arteries of the extremities in the hope of learning how they become diseased and how such conditions can be prevented or remedied.

Science News Letter, December 4, 1948

ENTOMOLOGY

Sowing DDT on Snow Keeps Mosquitoes Down

➤ THE OLD PRACTICE of sowing grass seed on March snow in order to insure a good lawn now has a parallel in the mosquito-fighting techniques being developed to make life more endurable in the Far North. U. S. Department of Agriculture entomologists, in cooperation with the Army and with Canadian scientists, have found that sowing DDT onto Arctic snow from airplanes is an effective means for keeping down the hordes of bloodthirsty insects that often make work out-of-doors impossible in the Far North.

As soon as the snow has melted and formed a wet sheet among the plants of the tundra, arriving mosquitoes are accustomed to lay their eggs. Now they find their erstwhile nursery a death-trap for both themselves and their young.

One advantage of the new technique is its relatively low cost. Sprinkled from low-flying airplanes, one pound of DDT is sufficient to treat 10 acres.

Science News Letter, December 4, 1948

WILDLIFE-AERONAUTICS

New Job for Jet Planes; Counting Ducks and Geese

➤ THE TOUGH JOB of counting wild ducks and geese at their wintering grounds was made easy and speedy with a jet plane and high-speed camera, the U. S. Fish and Wildlife Service reported.

The plane, a U. S. Air Force RF-80, photographed with a Sonne S-7 camera a 22-mile strip of marshes where wildfowl were feeding in California's San Joaquin Valley in 3.3 minutes recently. A ribbon picture 9.5 inches wide was made with the camera, which was synchronized with the 400-miles-per-hour speed of the plane.

Aerial surveys with slower planes have been handicapped by the roar of the plane's engines which frightened the birds and caused them to break into flight. Some of them would fly out of the camera's range. But the jet plane went over the ducks and geese before they were aware of its noise.

Science News Letter, December 4, 1948

CHEMISTRY

Capacitron Sterilization Helped by Partial Vacuum

➤ CAPACITRON sterilization of foods and medicinal products such as serums and vaccines is accomplished more quickly and with fewer undesirable by-effects if it is carried out in a partial vacuum, state Drs. Arno Brasch and Wolfgang Huber of the Electronized Chemicals Corporation, in the journal, SCIENCE (Nov. 12).

This improvement in the sensational new method for low-temperature preservation works best on finely powdered solids, slightly less well on liquids and compact solids. Desirable reduction in exposure time can be achieved by stepping up radiation intensity.

Science News Letter, December 4, 1948

CHEMISTRY

New Fiber Rivals Nylon

Synthetically produced "orlon" is credited with great strength, superior resistance to wear, heat and chemical action. Quantity production has not yet begun.

➤ A NEW synthetic fiber that will rival and surpass nylon in many uses is about to go into production. It is named by one company "orlon" and it is made from acrylonitrile, one of the ingredients of the synthetic rubber known as Buna N.

DuPont, also producer of nylon, is understood to have a plant being designed for production of orlon, which is the mysterious Fiber A that has been rumored for some time. Other chemical manufacturers, especially American Cyanamid and Rohm & Haas, produce acrylonitrile and may be expected to offer the new plastic.

The new fiber is said to possess great strength and to have superior resistance to wear, heat and chemical action.

Stockings, underthings and other clothing will not be made from it, because nylon is superior for such uses, but orlon will be used for curtains in homes, hotels and elsewhere and for industrial uses for which nylon has some shortcomings. One disadvantage in the new fiber is that it cannot be dyed as effectively as nylon. Orlon will also have use as sheets and in other solid forms.

Samples of orlon are known to have been distributed quietly for testing and evaluation by manufacturers and plastics users. Quantity production has not yet begun.

The basic chemical, acrylonitrile, is made primarily from petroleum, like so many other similar chemicals. The fiber is made by polymerizing the chemical, that is, treating it so that the molecules in it have a chance to grow bigger and longer, giving it a structure useful in fiber.

Improvements in chemical processes have made the acrylonitrile cheaper to produce. Combined with the desirable qualities of the orlon fiber, this has spurred the expected production.

Some of the earliest synthetic rubbers made in America before and during the recent World War were copolymers of acrylonitrile and butadiene. These rubbers were tradenamed Hycar or Ameripol and Chemigum, while Buna N is the present usual designation. The most widely produced synthetic rubber of the government's war program is made from butadiene and styrene and called Buna S. With cheaper acrylonitrile, greater commercial interest in the Buna N rubber is expected, because in some respects the acrylonitrile rubber is better than the styrene rubber.

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FOR MORE DURABLE LUGGAGE —A luggage smashing machine is shown in operation to determine the resistance to strain of the baggage. Tests closely duplicate stress encountered in travel.

GENERAL SCIENCE

"Baggage Buster" May Improve Suitcase Quality

➤ SMASHING LUGGAGE using a "baggage buster" which drops a 150-pound weight on a suitcase is one of a new series of tests at the National Bureau of Standards which may lead to more durable luggage for you in the future.

It's all part of a test to determine the durability of hand luggage. The Bureau wrecks all kinds of baggage to find out which ones take punishment best—the kind of punishment that your suitcases face each time you take a trip. Luggage is dropped from heights, picked up and set down by machine, punctured by special tools, all to determine its resistance to strain.

To check the results of the mechanical test, a set of bags was loaded and sent on a 12,000-mile trip around the country. Results of this trip and the mechanical test were almost the same, indicating that the Bureau's methods give a good test for stress encountered in actual travel.

Through heaps of destroyed luggage, the Bureau's scientists have emerged with a tentative standard for the strength of suitcases which may result in the development of new and stronger types of baggage. A piece of luggage, the Bureau says, should be able to withstand a weight of 150 pounds, dropped on any side. It should be able to take 25,000 pick-up motions of the machine and withstand rough dropping from various heights.

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ENGINEERING-AERONAUTICS

Jet Discharge Measured

➤ CHANGES IN DENSITY in supersonic gas jets, such as rocket and engine jets, can now be measured without inserting any sort of probe into the stream and without interfering with its flow.

John Winkler of the Palmer Physical Laboratory, Princeton University, has developed an optical system which can detect changes in density of gases issuing from a jet by passing a beam of light through it. An electric arc, struck from magnesium electrodes, furnishes a monocolored light which by a system of lenses and prisms is split in half, and half the light passed through the jet under study. A delicate optical comparison between the two halves of the light beam then shows how much the one has been slowed down by passage through the gases.

The sensitive system can trace flow lines of the streams of gas from the jet and then by suitable calculations scientists can arrive at values of pressure and temperature which are valuable in the study of jets. Heretofore, wires and tubes had to be stuck into the jet for such measurements and these interfered with the free flow of gas. This type of investigation is especially valuable for transonic and supersonic velocities where effects of compressibility become noticeable.

Shadow photography, which has long been used in studying the flight of bullets, aids in the study of jets by recording information to supplement Mr. Winkler's optical method. The shadow photographs show the geometrical shape of the shock fronts and slipstreams.

The new method is based on an older device developed by Mach in 1892 with which he measured the amount of bending of a beam of light as it passed through a denser substance.

Mr. Winkler reported that during his investigations he discovered that in 1930 the Zeiss optical works of Germany had built a large type of one of the earlier models of the instruments for Russia.

Science News Letter, December 4, 1948

PHARMACOLOGY

Pills Made Easy To Take

Medicines today are packaged in sugar-coated tablets and gelatin capsules to camouflage their bitter taste. Some containers are colored to avoid confusion.

➤ YOU SWALLOW many bitter pills these days without knowing that the medicine is bitter, thanks to sugar-coated tablets and gelatin capsules.

Hard, non-flexible capsules and soft, elastic ones are both used as containers for individual doses of medicine. Powders are packaged in the tough body of the familiar capsules before the cap is fitted on; measured quantities of oily liquids are poured into the flexible gelatin as the elastic capsules are being made.

Gelatin is usually preferred as the container for medicines because it is tasteless, dissolves easily and does not harm the patient. Gelatin shells made soft and elastic through the addition of glycerin permanently retain this flexibility.

Colored capsules are used to avoid confusion when a person is taking several kinds. Sometimes the transparent capsule shell is colored, sometimes the ingredients are tinted. When necessary, the shell can be made opaque to keep light from destroying light-sensitive ingredients such as vitamin B_2 or riboflavin.

Medicine today is compounded and packaged quite differently from the way it was prepared 25 to 50 years ago. New practices make possible more exact dosages, greater cleanliness and more appetizing preparations.

Tablets and capsules are rapidly replacing the pills of our grandparents' time. Cachets or wafers for bitter powders today are seldom seen in the United States. New processes for preparing unstable liquids have been introduced.

As many as 50 microscopic coatings of sugar solution are applied to a compressed tablet to give it the desired thickness. No color is added to the coating material used at the beginning; only the last few additions are tinted pastel shades to make them more appealing and palatable, and to protect the medication against the deteriorating action of the atmosphere. It often takes eight hours to apply the numerous coatings.

The drug industry employs a special method of dehydration to increase the stability of biological and pharmaceutical products which are unstable in liquid form. This lyophile process consists of freezing the liquid and evaporating the water in a vacuum. The water never becomes liquid, but passes directly from ice to vapor.

Samples demonstrating the latest methods of preparing medicines have been collected for you through the cooperation of Sharp & Dohme, one of the country's leading pharmaceutical houses, and Science Service. Several of them were specially prepared for the kit so none of the nine specimens would contain medication. Thus you, or your pet cat, will be none the worse for swallowing the tablets and capsules.

The capsules range in length from a half-inch, for small doses for humans, to 2 1/4 inches, to give large amounts of medication to horses and pigs. One is soft and elastic, the other stiff and non-flexible.

Uncoated and coated compressed tablets, a lozenge and a molded tablet demonstrate the more common methods of preparing medicine. Directions are given for making pills, today largely replaced by compressed tablets.

Lyophilized gelatin and distilled water are also included so that those unfamiliar with this process can see a product dehydrated in this manner, now widely used in preparing penicillin, streptomycin and blood plasma.

These specimens, with a leaflet telling how they were made and experiments that can be performed with them, may be secured by sending 50 cents to Science Service, 1719 N St., N. W., Washington 6, D. C. Just ask for unit No. 97.

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CHEMISTRY

"Cold" Rubber for Tires

The superiority of this synthetic product to natural rubber has hastened the conversion of plants to make possible large-scale production.

➤ MAN-MADE "cold" rubber makes markedly superior tires and other products and surpasses the natural tree-grown rubber. It is now going into large-scale production in America's chemical rubber plants.

What is happening is a new chapter in creative chemistry. During the recent war scientists made rubber from petroleum. They made this nation independent of unavailable natural rubber and gave us the essential tires for military and civilian transport.

Now the famous war-time GR-S rubber is being surpassed by post-war development of low-temperature manufacture, new chemical catalysts, and superior carbon black for compounding.

The rather chilly temperature of 41 degrees Fahrenheit, just nine degrees above freezing, is being used in the major cold rubber production. The temperature at which standard GR-S rubber is made is 122 degrees Fahrenheit.

Plants Being Converted

Over half of the operating capacity of the government-owned synthetic rubber plants, 200,000 out of 376,000 tons per year, is now in the process of being converted to cold-rubber production through installation of the refrigerating equipment necessary. Present plants do not need to be changed except to install tanks, compressors and other machinery for working at the lower temperature necessary. Eight out of the nine operating plants (all but the Akron plant) are being converted.

Glowing reports of the superior qualities of cold rubber have hastened the rush to its production. Synthetic rubber is now at least as good as the natural product, and most reports credit the low-temperature sort with being 20% to 40% better in wear. It does not heat up when tires are run at high speed any more than the natural sort, which was a fault of the older synthetic tires.

You may be getting some of the new cold rubber in tires that you buy without knowing it because tires made from it are not being labeled or advertised as such due to the present small production. In about a year most of the tires made are expected to be made with cold rubber.

Butadiene and styrene, polymerized together, are used to make cold rubber just as these two chemicals are the basic materials of the standard GR-S rubber. In polymerization, big molecules are made out of little ones. One key to low-temperature rubber production is the new sort of catalyst. In rubber technology, catalyst means an oxidizing agent that promotes polymerization and is used up in the process.

In the older synthetic rubber manufacture, potassium persulfate was used as catalyst, while in the cold rubber process cumene hydroperoxide is used. This organic peroxide was worked out in the University of Minnesota laboratories under the direction of Dr. I. M. Kolthoff and is a key ingredient of the low-temperature process, making it possible to complete the chemical reaction in a reasonable time, despite temperature.

Soap of fatty acid or rosin types is used in any kind of synthetic rubber formula in relatively large quantity to emulsify the chemicals used. More soap is used than styrene, one of the two chemicals that constitute the rubber.

In compounding the synthetic rubber into vulcanized products, such as tires, a new kind of carbon black, finely divided carbon filler for the rubber, is contributing greatly to the quality and economy of the product. This HAF or furnace black, as it is called, is made from oil or enriched natural gas.

Since synthetic rubber is a government operation growing out of the war situation, its price is controlled and set by the Office of Rubber Reserve. At present it is 18 1/2 cents a pound which compares with the current 22 1/2 cents a pound for natural rubber which is controlled by the British monopoly. Synthetic cold rubber is therefore cheaper as well as better than the natural material.

Latex rubber used in cord tire dipping, adhesives, rubber foam, textile coating, etc. is also being made by the low-temperature process with development of high gum tensile strength.

Because the synthetic rubber development is a government-industry undertaking, the cold rubber research and production is largely cooperative. Various rubber companies and research laboratories exchange information and work together.

The next step in cold rubber production will be to apply even lower temperature in hope of getting better and better quality rubber. One rubber company has made small scale polymerization at as low as 40 degrees Fahrenheit below zero, and some of this rubber has been tested in tires. Below-freezing processes are receiving fairly large scale, semi-commercial trials, with 14 degrees and 0 degrees as the temperatures being used. When subfreezing levels are encountered, anti-freeze must be used in the water used, just as in automobile radiators. This complicates the process. The lower temperatures also require more refrigeration.

Cold rubber promises to withstand better the arctic temperatures that trucks and other equipment must encounter in case of another war. Rubber made at 41 degrees also does not crack as easily as ordinary rubber.

Low-Temperature Rubber

Hints of the possibility of low-temperature rubber production antedate the government rubber program that began in 1940. It was early recognized that low-temperature polymerization would produce rubber of better quality, but the 122-degree temperature was adopted because the emergency was great and the standard process gave known results with the reaction running 14 hours. During the war the "speed-up" chemicals increasing the polymerization rates at low temperatures were developed, and German experience with low temperature rubber recipes became known. With the end of the war, the effort to improve the process could be resumed. The use of what is called the "redox" system, involving oxidizing ("catalysts") and reducing agents, was refined and ap-

500 TIMES BRIGHTER—The large electronic tube shown here is the first working model of the X-ray "telescope" which will brighten by 500 times the living image viewed by the doctor on the screen of the X-ray fluoroscope. Westinghouse scientist Dr. Richard L. Longini is shown closing the doors of a special electric furnace in which the tube will be baked and evacuated of air.

plied, with the practical results coming this year on a considerable scale.

Most of the rubber companies contributed to the development. The first pilot plant production of low temperature polymers was made by Phillips Petroleum Company in the late spring of 1946, while shortly after the middle of 1946 Goodyear produced a ton for experimental use. The U. S. Rubber Company made the first plant scale run of low temperature rubber experimentally in the summer of 1947, while the Copolymer Corporation at Baton Rouge, La., after pilot plant operation the same year, converted half of its 30,000 ton capacity to 41 degree rubber early this year.

Plants now being converted to cold rubber production are: Copolymer Corp., at Baton Rouge, La., U. S. Rubber Co. at Naugatuck, Conn. and Borger, Tex., Goodyear Synthetic Corp. at Houston, Tex., and Los Angeles, Calif., Firestone Tire and Rubber Co., at Lake Charles, La., B. F. Goodrich at Port Neches, Tex., General Tire and Rubber Co., at Baytown, Tex.

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ASTRONOMY

Palomar Giant Incomplete

➤ THE 200-INCH telescope atop Palomar Mountain is about to begin to probe the universe.

Nothing but test pictures have been taken to date with this giant telescope, dedicated six months ago (June 3).

When completed, the telescope will penetrate twice as far into space as previously possible. It will make available eight times the volume of space astronomers now have at their disposal.

But testing and adjusting is a time-consuming job, reports Dr. Ira S. Bowen, director of both Mount Wilson and Palomar Observatories. Progress is "good," and no slower than anticipated.

Latest estimates indicate that the Hale telescope, to be operated jointly by California Institute of Technology and Mount Wilson Observatory of the Carnegie Institution of Washington, will actually go into operation late next spring.

Latest score on the world's largest telescope shows:

Final adjustments must be made on the 200-inch mirror.

Two of the telescope's seven mirrors have yet to be finished, installed and adjusted.

Coude spectrograph is still incomplete.

Ross correcting lens remains to be installed at the telescope's prime focus.

The telescope is a reflector, not a refractor. Thus it is made of mirrors rather than lenses. The 200-inch mirror, of course, is the largest of these. It weighs 14 3/4 tons.

Minor modifications were made on the support system for the telescope this summer, and new adjustments are now being completed. More tests are being run to check the mirror.

Three respects in which this telescope will surpass all other telescopes are:

Dispersion, of importance in the study of the relative abundance of elements in the universe.

Resolving power, of value in deciding whether there are canals on the planet Mars, thus indicating whether or not intelligent beings exist there.

Space penetration, helpful in deciding whether the universe is expanding, as many astronomers believe.

When finally completed, the telescope will catch on photographic plates light that started its journey to the earth a billion years ago.

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ENGINEERING

Trestle-Tube Proposed

➤ A UNIQUE combination of bridge, earth-fill and subway tube across San Francisco Bay, to handle increasing highway traffic now beginning to overtax the San Francisco-Oakland Bay Bridge, is suggested in an official report to the State of California.

The tube, considerably over a mile in length, would extend from the end of a bridge on one side to an extended earth-fill on the other, dipping between into the floor of the bay. It is one of two plans recommended in the report by Ralph A. Tudor, chief engineer of the California Division of San Francisco Bay Toll Crossings. The other is a twin bridge parallel to the present structure.

The trestle-tube combination presents difficult engineering and geological problems which both engineers and geologists believe can be solved. The soft mud at the bottom of the channel is one of the principal of these. The proposed solution is to dredge it out to a hard base, and to put in its place a foundation of sand.

The total crossing would be some six and one-half miles in length. The trestle bridge would be about one mile long. The proposed tube would be approximately 6,000 feet in length, and an earth-fill would occupy the rest of the crossing length. Three parallel tubes are proposed. Each would be 37 feet in diameter and constructed of reinforced concrete. They would be constructed near shore in three sections with bulkheads, and floated to position. Giant cranes would lower them to the prepared bed of sand, where the sections would be joined together.

Geological studies of the channel mud bed have already been made under the direction of the supervising geologist, Parker D. Trask, of the San Francisco Bay Toll Crossings. He states that the depth of mud to be removed runs up to 50 feet. Suitable sand for replacement has been located about five miles away.

The sloping tubes on both ends would be supported and protected by sand islands extending well above the high-water line. The islands themselves would be protected from current and wave action by heavy riprap. This combination scheme leaves a clear unobstructed channel for shipping. A tube for the entire crossing distance is economically impracticable.

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AGRICULTURE

"Turkish" Tobaccos Now Grown in United States

➤ THE UNITED STATES may soon be able to declare independence again—this time from Turkey. Turkish-type tobaccos, noted for their high aroma volume, are necessary ingredients of all quality cigarettes.

Spurred by wartime shortages, plant scientists at Duke University under the leadership of Dr. Frederick R. Darkis have successfully grown high-aroma tobaccos in cooperation with the agricultural experiment stations of Virginia and the two Carolinas. The new American "Turkish" tobaccos are also low in nicotine.

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METEOROLOGY

Sun and Moon Cause Tides in Atmosphere

➤ UNOBSERVED by human senses, two daily tides sweep through the ocean of air at the bottom of which we live. Their existence and causes were discussed by a noted Norwegian meteorologist, Dr. J. Bjerknes of the Geophysical Institute of Bergen, before the meeting of the National Academy of Sciences in Berkeley, Calif.

One of the tides is a response to the pull of the moon, the other to that of the sun, with the solar air tide much the higher. Its crests come at 10 a.m. and 10 p.m. at sea level; but there is a "tilt" in their height, Dr. Bjerknes stated, so that on a mountain 17,000 feet high the crests come at noon and midnight. He presented results of calculations tending to show that the amplitude of the solar air tide is strengthened by the heating effect of the sun.

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RADIOBIOLOGY

Atomic Radiation Hazards

Scientists disagree over meaning of the atomic bomb threat. One holds out hope that some symptoms can be treated, the other warns that there is no defense.

➤ HOW GREAT is the threat of atomic radiation to you and me?

Two physicians who studied on the spot the biological effects of the explosions of atomic bombs have just weighed their scientific evidence and come up with different verdicts. There is little difference over facts, but a big difference in what these scientists find the facts mean to us.

The "mystery" of radiation gets a "partial debunking" from Dr. Austin M. Brues of the Argonne Laboratory and the University of Chicago's Institute of Radiobiology and Biophysics. He investigated radiation effects in Japan after the atomic bombings.

Writing in the BULLETIN OF THE ATOMIC SCIENTISTS (Nov.), published in Chicago, Dr. Brues says that radiation, "like many other things, creates an illness, some symptoms of which can be counteracted by known treatment." He believes we can hope reasonably to find further treatments for this illness.

"Cancer may be made more likely to occur by radiation exposure, but exposure to sunlight will also increase one's chances of skin cancer," Dr. Brues points out.

As for the genetic effect of radiations on future generations, the scientist declares: "Chemical agents are known, in fact (and some of them may be encountered in ordinary life), which will cause genetic mutations."

Radiations, he adds, have no effect that cannot be duplicated by some drug or chemical which is known. As a matter of fact, he argues, Geiger counters and other instruments can do a better job of detecting dangerous radiation than scientists can do in tracing some poisons.

More dangerous in modern warfare than atomic radiations, Dr. Brues cautions, may be the panic caused by fear and ignorance of effects of radiation. This was only a secondary factor in the atomic bombing in Japan, but it might be worse in this country in event of war, Dr. Brues warns.

Less hopeful than Dr. Brues, is Dr. David Bradley in his gloomily-titled new book, NO PLACE TO HIDE, (Atlantic-Little, Brown). Dr. Bradley served in the radiological safety section at the Bikini atomic bomb tests. His book is a log of his experiences at Bikini.

Dr. Bradley's conclusion:

"1. There is no real defense against atomic weapons.

"2. There are no satisfactory countermeasures and methods of decontamination.

"3. There are no satisfactory medical or sanitary safeguards for the people of atomized areas.

"4. The devastating influence of the Bomb and its unborn relatives may affect the land and its wealth—and therefore its people—for centuries through the persistence of radioactivity."

Describing the instruments for detecting dangerous radiation, Dr. Bradley says, "It is perfectly clear that nature had no intention that any of her children should be monkeying around with radioactive elements, else she would have provided us with some sixth sense to protect us from running headlong into dangerous amounts of radiation."

But he agrees that radiation sickness is "a definite and predictable disease. We know more about it than we do of measles."

Of the dangers of radiation, Dr. Bradley, too, warns of ignorance and fear. Radiation characteristics he finds "real and impressive enough without investing them in the terrors of the supernatural."

Both scientists seem to agree that public understanding of radiation and its hazards is one vital hope for living with harnessed atomic energy.

Science News Letter, December 4, 1948

ARCHAEOLOGY

Indian Skeleton Found With Head Under Arm

➤ A BRITISH music-hall hit of some years ago, still popular as a recording in this country, recounts how the ghost of a certain "lydy" went about in the Tower, o' nights, "With 'er 'ead tucked underneath 'er arm." An early American counterpart of this situation has been discovered in an Indian grave near Monona, Wis., excavated jointly by scientists of the University of Wisconsin and Beloit College. The skeleton they dug up was normal in all respects—except that the skull was tucked under the bones of its left arm.

The site, known as Frost Woods, promises to become an archaeological classic, for it comprises a dozen or so mounds of the high Indian culture known as the Hopewell, first found in southern Ohio, but since proven to have existed at least as far west as Iowa. Many of her skeletons, most of them fragmentary, have already been excavated there, as well as a large number of artifacts.

Science News Letter, December 4, 1948

INDIAN REMAINS—Believed to be remnants of the ancient Hopewell tribe whose civilization flourished some 10 or 15 centuries ago, these skeletal remains, found in Frost Woods, Wis., are said to be in "remarkably good" state of preservation.

PHYSICS

New Electron Tube Makes Magnetism Visible

See Front Cover

➤ A PHOTOGRAPH of the paths taken by magnetic lines of force with the aid of a new electron tube developed by Prof. Samuel G. Lutz and S. J. Tetenbaum, a graduate student, at the New York University College of Engineering, is shown on the cover of this week's SCIENCE NEWS LETTER.

When electricity is sent through the tube, technically called a mercury vapor diode with a perforated anode, a ball-shaped bluish glow is visible. When the lighted tube is brought near a magnet the glow changes into a spiral and finally into a group of intense blue lines of illumination, curved or straight, to conform with the magnetic field.

Dr. Lutz said that the new tube will be useful as a demonstration device and as a means for observing unusual magnetic fields. The photographic technique employed is not difficult, involving a series of exposures made in a darkened room on one film. The tube is held in a number of positions for a set length of time in order to record the shape of the field being investigated. When the film is developed, these successive exposures appear superimposed as distinct white lines.

Science News Letter, December 4, 1948

CHEMISTRY

Steam Rather than Steel Makes Safe Fire Resistant

➤ STEAM, not steel, makes an approved safe fire resistant.

Edwin H. Mosler, Jr., of the Mosler Safe Company in Hamilton, Ohio, explains that vaporizing of moisture in chemically combined form in the insulation actually does the trick. During a fire, the moisture becomes steam at 212 degrees Fahrenheit. Great amounts of heat are dissipated in the transformation, thus keeping the inside safe temperature well below the danger point of 350 degrees Fahrenheit at which paper and records are likely to begin igniting.

Fusible plugs in the outside plate melt at a low temperature to provide minute vents through which the steam harmlessly escapes.

Science News Letter, December 4, 1948

NUTRITION

B Vitamins Now Number 12 Or More; Food Best Source

➤ AT LEAST a dozen different B vitamins exist. Ten of them can be obtained in pure crystalline form. But there are probably more B vitamins awaiting discovery.

The 10 that have been obtained in pure form, as summarized by Dr. C. A. Elvehjem of the University of Wisconsin in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Nov. 27) are: thiamine, riboflavin, nicotinic acid (niacin), vitamin B_6, pantothenic acid, choline, biotin, inositol, para-aminobenzoic acid, and folic acid.

"The common foods still remain the best source of these vitamins in practical nutrition," Dr. Elvehjem states.

One reason is that foods supply all the unknown ones along with the known ones.

The B vitamins occur in different proportions in different foods, and also in different commercial vitamin concentrates. Oatmeal, for example, contains more than twice the amount of thiamin that liver does, but only one-twentieth the amount of riboflavin that is in liver.

Commercial concentrates are valuable for treating specific deficiencies of one or another of the B vitamins. But unless properly used, they give no greater security of supplying all the B vitamins one needs than the proper combination of natural foods.

Science News Letter, December 4, 1948

BIOCHEMISTRY

New Insecticide Can Cause Hereditary Plant Changes

➤ GAMMEXANE, or 666, the new and highly potent insecticide, is capable of causing the plants it protects to produce changeling offspring unless another chemical is used along with it to prevent this undesirable action. At certain concentrations its effects are like those of colchicine, checking cell division in mid-career and thus artificially doubling the number of chromosomes. This results in sudden hereditary changes, often causing the production of giants in following generations—and giants are not always desired by plant growers and breeders.

Another effect, more immediate, is the growth of tumors and other deformities in the immediate generation on which it is used.

Discovery of a compound that will neutralize this effect of Gammexane is announced in the journal, SCIENCE (Nov. 19), by a three-man research team who have been working on the problem at Columbia University and the U. S. Department of Agriculture's experiment station at Beltsville, Md. The compound is a member of the vitamin B group, known technically as meso-inositol. It is found in both animal and plant tissues, and its tumor-preventing properties were already known.

The research team consists of Drs. Erwin Chargaff, Robert N. Stewart and Boris Magasanik.

Science News Letter, December 4, 1948

IN SCIEN

DENDROLOGY

Scattered Tree Cousins Once Lived Close Together

➤ FOUR RELATED kinds of trees that are now widely scattered strangers, though all of them are members of the same plant family, grew as near neighbors a few tens of millions of years ago, Dr. Ralph W. Chaney of the University of California told the National Academy of Sciences meeting in Berkeley, Calif.

The trees in question are the bald cypress of our southeastern states, the sequoias of California, the China cypress or glyptostrobus of southern China, and the recently discovered "dawn redwood" of interior China. The two Chinese genera are now the nearest neighbors, and even they are separated by hundreds of miles.

Yet in Miocene geologic time, some 20,000,000 years ago, all four genera grew in a limited area in interior Oregon. They had got there from their points of origin in Alaska and elsewhere in the Far North, taking about 20,000,000 years for the trip. Now their fossil remains are all found together within a 60-mile distance, in a geologist's paradise known as the John Day Basin.

Though their fossils are found in this basin, the trees themselves have long since disappeared from it, and their present widely separated habitats differ sharply from each other in both topography and climate.

Science News Letter, December 4, 1948

GEOLOGY-PALEONTOLOGY

Millions of Years Added To Rocks by Shark Spines

➤ ANCIENT shark spines, discovered in South America by a University of Cincinnati scientist, have set back the age of some rock formations by at least 100,000,000 years.

Dr. Kenneth E. Caster, paleontologist, just returned from an exchange professorship at Sao Paulo, Brazil, explained that the shark spines and associated fossils were the first of their type ever to be found in Devonian rocks of the Paleozoic age. Rock formations thought to be 200,000,000 to 250,000,000 years old are now believed to be 350,000,000 to 400,000,000 years old, because of the new discoveries.

First fossils of giant sea scorpions ever found in the southern hemisphere were also identified by Dr. Caster. The scorpion remains occur in great abundance in the Brazilian state, Piaui, but they had been previously identified as plant fossils, the scientist said.

Science News Letter, December 4, 1948

E FIELDS

ACOUSTICS

You Can "Get Het Up" If Noises Become too Noisy

➤ THERE IS DANGER in a very intensely noisy world of temporary loss of hearing, getting hot due to sound absorption and even interference with moving of muscles properly.

Two Air Force scientists told the Acoustical Society of America in Cleveland how jet engines roaring in confined space and powerful sirens produce physiological effects in human beings and animals. Temporary hearing losses of as much as 70 decibels (about enough to make it difficult to hear ordinary street noise) were recorded immediately following exposure of men to the siren sound, even when conventional ear defenders were worn.

Rats and guinea pigs exposed were found to convert to heat enough sound energy to raise their body temperatures 20 to 30 degrees Fahrenheit and produce death in as little time as 10 minutes. The scientists found that a lethal sound field might be only one to three decibels more intense than one which will not kill.

The researches were done by Lieut. Donald H. Eldredge and Dr. Horace O. Parrack of the Biophysics Branch, Aero Medical Laboratory, Air Materiel Command, Wright Field, Dayton, Ohio.

Fur increases the absorption of sound as the frequency increases, that is, the sound gets shriller. Dr. H. E. von Gierke of the same laboratory reported that shaved skin absorbed less and less sound energy as the frequency increased above a thousand cycles per second, whereas furred skin absorbed more and more.

Science News Letter, December 4, 1948

ENGINEERING

Gas Produced Economically From Oil by New Process

➤ HOUSEHOLD GAS from low-cost oil can be made by a new economical process, it was revealed in New York by the American Gas Association. The process utilizes troublesome coke deposits in present methods as fuel for heat to gasify heavy oil.

Present oil gas processes are unable to use the cheaper, heavier oils successfully because their large carbon content forms excessive quantities of petroleum coke within the gas generator. This makes it necessary to remove the generator from service from time to time so that the equipment can be purged with air currents to burn out the coke.

In the new process, an invention by Edwin L. Hall, director of the American Gas Association laboratories at Cleveland, Ohio, the coke deposit is burned off during the gas-making period and supplies a good portion of the heat necessary for gasifying the heavy oil without requiring any additional time.

The process, tested for a year in a commercial installation, makes possible a reduction of 30% or more in the cost of gas-making materials, the association states, and an increase of about 35% in thermal capacity of existing gas-making apparatus.

Science News Letter, December 4, 1948

NUTRITION

High School Boys Eat Better than Girls

➤ HIGH SCHOOL boys are better eaters than girls, not only in quantity but in quality, Dr. Frederick J. Stare of Harvard found in a survey of New York State school children. And the grade school youngsters know their vitamins better, as shown by what they eat, than their older brothers and sisters. City children fared better than rural children, those in academic schools ate better, nutritionally speaking, than those in vocational schools, and, as might be expected, children of parents at higher income levels had better diets than those whose parents were not so well off. Dr. Stare's findings were presented to the American School Health Association meeting in Boston.

Science News Letter, December 4, 1948

AERONAUTICS

Altitude Record Set by Signal Corps Balloon

➤ A NEW balloon altitude record of 140,000 feet was established recently in weather forecasting and rocket launching experiments at the Evans Signal Laboratory, Belmar, N. J.

Lt. Col. A. F. Cassevant, Evans Signal Laboratory director, who announced that the record was set on Sept. 28, pointed out that the greatest height ever attained by a balloon carrying human beings was 72,395 feet. That was accomplished in 1935 by Captains Albert W. Stevens and Orvil A. Anderson. The balloon that rose 140,000 feet carried only meteorological instruments.

The record-breaking balloon is made of neoprene latex and is approximately 17 feet in diameter at the time of release. It is only partially inflated when it leaves the ground and first becomes spherical at an altitude of about 35,000 feet.

The balloon expands as it continues its ascent, reaching a maximum diameter of approximately 75 feet, when it bursts.

Science News Letter, December 4, 1948

ARCHAELOGY-GEOLOGY

Discover Stone Age Tools On Former African Beaches

➤ EARLY Stone Age tools, used by prehistoric man, have been found at the former sites of beaches in Mozambique, Portuguese East Africa, indicating that the ocean may have receded 40 to 50 miles and dropped its level by 150 feet since Stone Age man first inhabited the continent.

Discovery of this geographical change was made recently by a group of University of California African Expedition scientists, including Prof. Gelal Awad of Farouk University, Alexandria, Egypt, and Dr. H. B. S. Cooke, South African geologist. The group was invited to Mozambique by the Portuguese government.

Expedition scientists, under the direction of Wendell Phillips, also found a number of new types of fossil marine shells, some of them laid down on the beds of dried-up seas for as long as 80,000,000 years.

Importance of the discovery of sea level changes in the area is that it will yield valuable geographical information for future studies of the relation between man and his physical environment on this part of the continent.

Science News Letter, December 4, 1948

AERONAUTICS

Berlin Airlift Will Be Aided by Krypton Lights

➤ THE BERLIN airlift, bringing food to the city's population, will soon be aided by krypton gas approach lights at seven airports, it was revealed by Westinghouse, developer of this type of light which is visible through a thousand feet of dense fog.

A six-light system will be installed at each of these seven landing fields, which include the Berlin Tempelhof Airdrome. The first two sets of six lights each will be delivered to the Air Force within 60 days.

Each of the new lights, containing the rare gas krypton found in the atmosphere, will have a brilliance of more than 3,000,000,000 beam candlepower. The six lights in each system will flash one after another in the wink of an eye and appear to a pilot as a flash of lightning. This European installation is intended primarily to help pilots locate the landing fields in spite of bad weather.

Westinghouse krypton lights were given their first airport test on a Cleveland field. The first commercial installation is the system at New York's new International Airport. A system including 35 of these krypton lights is already undergoing testing at the Landing Aids Experiment Station, Arcata, Calif., said to be the foggiest spot in the nation.

Science News Letter, December 4, 1948

TYPOGRAPHY

Printing Gets "New Look"

A machine which may outmode movable type and high-speed presses that may be able to print in six colors are some of the promising advances ahead.

By WATSON DAVIS

➤ THE PRINTED WORD, so important in keeping you up-to-date on news of the world or entertaining you, is getting a "new look" to those expert in the technical processes of printing.

The pages of this magazine or other printed material are not likely to look markedly different in coming months. But a tremendous spurt of experimentation in printing methods and apparatus is taking place behind the scenes.

It is a big leap from Gutenberg to the high-speed rotary newspaper press. Gutenberg in the 14th century is credited with inventing movable type.

One advance in the next few years is likely to outmode the movable type, whether set by hand or by machine. It is composing by photography.

Several photocomposing machines are in experimental use and one company known for typesetting machinery has its photocomposer in day-by-day use in several large plants.

Photocomposing Machines

Usually these photocomposing machines will be used to set up material for lithographic printing. Lithography has come a long way from the days when an artist drew pictures directly on a special stone from which copies could be made by use of the fact that ink would stick to the markings and not to the stone. Lithography is now generally done from a metal plate on which the reproducing images are placed by photographic processes.

The new photocomposers are useful because usually type matter to be lithographed has to be set with ordinary type and then a proof pulled which must be photographed as a negative in order to transfer the image to the lithograph plate. These additional steps for getting words into lithographic copy impose a burden upon the process.

Photocomposers would make negatives directly and these could be used for making plates for lithography—for rotogravure or for line engraving that can be printed on ordinary presses—what is called letterpress.

In the Government Printing Office in Washington, one of these photocomposers is at work and it has been used on various jobs, including a series of guides for the National Parks. This machine is the Intertype Corporation's Fotosetter. Other such machines are in experimental production or use.

A new kind of high-speed press is being developed with the idea of using electricity to entice the ink from the plate to the paper, without the paper and printing even coming into wearing contact. This "electronographic" press of the Huebner Laboratories is in pilot press stage, but many printers are excited about it because it may be able to print in six colors on both sides of a roll of paper at the same time—bringing color at high speed to newspapers and long-run magazines.

With color invading the printing processes at a great rate, another new device is an apparatus that matches colors electronically in making the printing plates by various processes.

In Chicago for many months the newspapers have had a different appearance because the compositors who run the typesetting machines have been on strike. The newspapers have been getting around this lack of typesetting by making photoengravings of typewritten copy, much as they normally reproduce from drawings and photographs the illustrations of the newspaper. This typeless printing short-circuits the linotype and intertype composing machines necessarily idle because of strike. Everything else—plating-making presses, etc.—is the same.

This emergency method, which has focused attention on printing technology as never before, is really not anything new. It was used by the old Literary Digest magazine nearly 30 years ago when its typesetters were on strike. It was used a little later in London and Paris for a similar reason. Within the past year its use in this country has greatly increased.

Typeless Printing

The Literary Digest typeless printing job was merely photographic reproductions of typewritten pages made with ordinary typewriters. It opened the eyes of publishers to a possibility of a printing method perhaps better than that used for long years. It also interested inventors in developing special typewriters for the purpose and better and more rapid methods of electroengraving.

In early ordinary printing tiny rectangular strips of metal, with a letter in reverse on the end, were assembled by hand in proper order in a form from which the

WHIRLING PRESSES—This high-speed rotary newspaper press marks centuries of progress since Gutenberg who is credited with inventing movable type.

PHOTOCOMPOSING — Machines, called photocomposers, make negatives of the material desired which are then used for making plates for lithography. Here a series of guides and other publications were produced by this method.

printed matter was made. This process is still used to a certain extent but is too slow and costly for printing in quantity.

Most type is now set by such machines as the linotype which produces type cast in lines or bars.

The hand-set or linotype-cast bars of type are set in frames in a printing press. Ink is applied to the face of the type. Then the paper to be printed is pressed against it. However, if many copies are to be printed, lead casings called stereotypes are made of each page. These can be used on the rollers of high-speed rotary presses.

The typesetting trade is as old as printing itself. It is not to be expected that no typesetters will be needed in the future. Newspapers and other printing plants have huge investments in giant typesetting machines. However, new printing companies will certainly study the new process and may decide to use typists instead of typesetters. And as the giant machines become worn out in old plants, some of them may never be replaced.

One problem encountered in using ordinary typewriters for newspaper work is to arrange the reading material in lines of equal length and in columns perfectly aligned on the right as well as the left side. In ordinary typesetting this may be accomplished with inserts to widen the spaces between the individual types or between separated words. In the ordinary typewriter there is no way of spacing letters farther apart, but greater space may be put between words.

Justified Copy

Justified copy is the printer's term for properly columned type. Justifying typewriters are relatively new typing machines which can be used to produce justified copy. There are several on the market and others in the testing stage. Some of them will permit the changing of type face or size. Some have type especially designed for newspaper work, producing copy that resembles closely the familiar printing type. Some have provisions for an improved spacing of letters, with more space for wide letters and less for the thin ones. This provides easier reading.

After the justified copy has been typed, it must be assembled into pages. The columns are pasted on a make-up cardboard sheet the size of which depends upon the

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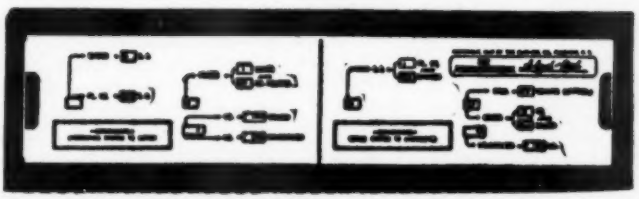

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size of the page to be printed. This form page is photoengraved on metal, and stereotypes made from the engravings. These are placed in the rotary press. The proposed, and partly in use, printing process has advantages and disadvantages of course. One appeal to printers is a probable saving in printing costs. Ordinary typists with a little special training can operate the justifying typewriters, and typist wages are only about one-half of that paid members of the International Typographical Union. There is a similar reduction in make-up costs, and new devices for electro-engraving can be operated with personnel of only a few days training.

There are several devices which permit the use of regular linotype machines by ordinary typists. One is a typewriter keyboard attached to the keyboard of the linotype which, instead of producing ordinary typing, operates the linotype producing the same cast lines which the trained linotype operator would produce.

Then there is the teletypesetter which has been in use for some time. These machines have typewriter keyboards, and when used produce a tape with perforations that represent letters and punctuation marks. This tape is then put in a special device on a standard typesetting machine, and automatically controls the operation of the machine to produce cast bars of printing type.

This device is used for operating typesetters at a distance from the office where the perforated tape is made. Electrical impulses sent with its use operate typesetters in distant cities where copies of publications are printed to save time and cost in distribution.

The Vari-Typer, made by Ralph Coxhead Corp., New York, is a semi-automatic justifying typewriter with interchangeable type faces, includes several hundred sizes and styles. In use, two manual typings of the material are necessary. The matter to be printed is first rough-typed with the varityper itself, or with an ordinary typewriter, on the left side of a sheet, justified as far as possible. The typed sheet is then put in the justifying machine, or if it is already in it the carriage is moved to the left. In retyping each line, the machine automatically justifies it.

Typeless printing may be said to be in an experimental stage but its future is definitely promising. The printing industry is watching developments closely. The newspaper business is keenly awake to its possibilities and will not let others surpass it.

Science News Letter, December 4, 1948

ENGINEERING

Gas Turbine Locomotive Is Undergoing Tests

➤ NEWEST development in locomotives is under test by the American Locomotive Co. and the General Electric Co. in Erie, Pa.

The first gas turbine-electric locomotive to be built and operated in this country will be operated on a demonstration basis by the Union Pacific Railroad next summer. This locomotive is now fired by oil, but engineers hope it will lead to a successful coal-burning gas turbine.

Science News Letter, December 4, 1948

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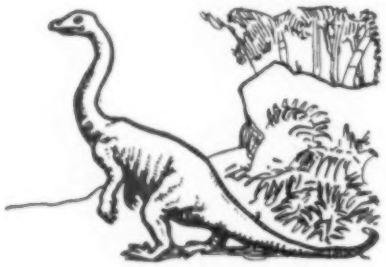

Meek Inherit The Earth

➤ BIG THINGS can evolve out of little ones, but not little things out of big ones.

The whole course of evolutionary history is littered with examples of developmental lines of animals and plants that started small, grew big, then huge, and then—died. Faced with changed and adverse conditions, they apparently could not contract the scale of their operations to weather the storm. They could only go into involuntary bankruptcy and pass out of the picture.

It was so with the dinosaurs. The earliest reptiles, in the age that succeeded the lush days of the coal era, were moderate-sized beasts. The biggest of them did not outrank modern crocodiles or the giant tortoises of the Galapagos. In succeeding geologic periods, one reptilian line, the dinosaurs, began to take on size; first as big as a horse, finally as big as a house. Then came one of the world's periods of major geologic change—a revolution—and down went the dinosaurs. The reptiles that survived and now possess their modest share of the earth were the less ambitious, less grandiose orders—lizards, tortoises and turtles, crocodilians, and the later-appearing snakes.

The same is true of the giant plants that lived in the coal age. They were, some of them, relatives of the common horsetail rushes that now grow along railway embankments and in moist sandy soil. They aspired to great heights, developed into things as big as the giant cacti of our Southwest. But when geologic hard times came they couldn't "take it," and so passed out, leaving their share of the picture to their poor relations, the smaller horsetails, that somehow managed to struggle through not only those hard times but all that followed, and are still with us.

The same story could be told about a dozen families of mammals, that appeared on the scene much later. Elephants will do as a type example. The earliest ancestral elephants we know anything about were animals not much bigger than a pig, without the great trunk and tusk development that came later. They grew and grew in succeeding geologic periods, until just prior to and during the last great glacial epoch they reached their climax in beasts more than a dozen feet high at the shoulders, with tremendous curved tusks. But they all went, with the exception of the two surviving species in Asia and Africa. And these, even without the deadly interference of man, must surely have followed their forefathers before many more thousands of years.

The meek always inherit the earth—and when they cease to be meek they presently lose it again.

Science News Letter, December 4, 1948

GEOLOGY

Earth's Record in Rock

➤ GO TO the bottom of the sea. Punch a hole a hundred feet deep. You can then bring up to the surface a core of rock and mud that will record the whole long history of the earth, two billion years or so of geologic time.

Dr. Maurice Ewing, Columbia University geologist and oceanographer, who has this summer probed the floor of the Atlantic, told the National Academy of Sciences meeting in Berkeley, Calif., that this is a possibility.

The longest core yet captured by Dr. Ewing is 37 feet from the floor of the Atlantic, but Swedish scientists have one that is 60 feet long. Dr. Ewing predicted that a hundred foot sample, less than formerly believed to represent the sediments since the beginning of earthly time, can be obtained in the near future. Microscopic fossils in the earth cores give valuable new clues to our picture of the earth.

Dr. Ewing also stated that the depth of granite bedrock, lying under the ocean mud, can be determined by the explosion of depth charges under the surface. The refraction, or echo, that follows the explosion can be used to determine the depth and nature of the bedrock. Such measurements, in the mid-Atlantic, have shown a granite layer 40,000 feet thick, under which lies basalt rock.

Science News Letter, December 4, 1948

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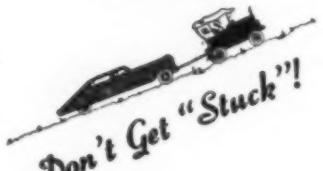

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BATHOLITH AND ASSOCIATED ROCKS OF CORONA, ELSINORE, AND SAN LUIS REY QUADRANGLES SOUTHERN CALIFORNIA—Esper S. Larsen, Jr.—*Geological Society of America,* 182 p., illus., $4.50.

BOY'S BOOK OF SNAKES: How to Recognize and Understand Them—Percy A. Morris—*Ronald,* 185 p., illus., $3.00. How to catch them and how to feed and care for them as pets. Also an account of those you are not likely to see except in zoos.

CONTRIBUTION TO THE BIOLOGY OF THE PHILIPPINE ARCHIPELAGO AND ADJACENT REGIONS—Theodor Mortensen—*Govt. Printing Office,* 47 p., paper, 30 cents.

CRUCIBLES: THE STORY OF CHEMISTRY: From Ancient Alchemy to Nuclear Fission—Bernard Jaffe—*Simon and Schuster,* Rev. ed., 480 p., $3.95. Human interest stories in chemistry from Trevisan to Lawrence.

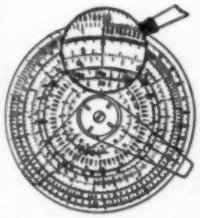
DESIGN OF INDUSTRIAL EXHAUST SYSTEMS—John L. Alden—*Industrial Press,* 2d ed., 252 p., illus., $3.50. Instructions for designing, building or buying.

FINDINGS AND RECOMMENDATIONS OF THE PHARMACEUTICAL SURVEY 1948—*American Council on Education,* 49 p., illus., paper, $1.00. Recommending, among other things, the in-service training of pharmacists.

FREEDOM FROM WANT: A Survey of the Possibilities of Meeting the World's Food Needs, A Symposium—E. E. DeTurk, Ed.—*Chronica Botanica,* 283 p., illus., paper, $2.00. In a foreword, the director-general of FAO says, "It looks very much as though the road along which the human race is driving right now leads to a dead end—and I mean dead. But I would not agree that this is the only road mankind can follow." This book points out a new way.

THE FREEZING OF SUPERCOOLED WATER—N. Ernest Dorsey—*American Philosophical Society,* 81 p., illus., paper, $1.75. A technical report by a Bureau of Standards expert.

HEALTH PROGRESS 1936 TO 1945: A Supplement to Twenty-Five Years of Health Progress—Louis I. Dublin—*Metropolitan Life Insurance Company,* 147 p., illus., paper, free upon request to publisher by those interested in the advance of public health. An interesting account of the battle against disease.



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ILLINOIS CONFERENCE ON INDUSTRIAL RESEARCH—*Armour Research Foundation,* 68 p., paper, $1.00. Proceedings of a meeting at the Illinois Institute of Technology, May 27-28, 1948.

LAMBERT'S HISTOLOGY: An Introduction and Guide—Revised by Helen L. Dawson—*Blakiston.* 2d ed., 696 p., illus., $6.00. Text for beginning students beautifully illustrated with photomicrographs, many of them in color.

LIPPINCOTT'S HANDBOOK OF DENTAL PRACTICE—Louis I. Grossman, Ed.—*Lippincott,* 417 p., illus., $12.00. A guidebook for the practicing dentist, including much new material.

MINERALS YEARBOOK 1946—Allan F. Matthews, Ed.—*Govt. Printing Office,* 1629 p., illus., $3.75. Publication of this volume of statistics was delayed by reductions in staff and increased number of special assignments in connection with the Marshall Plan and other matters.

ORGANIC CHEMISTRY—Hugh C. Muldoon—*Blakiston,* 3d ed., 648 p., illus., $5.50. Text for beginners rewritten to include much new material.

PROFESSIONAL OPPORTUNITIES IN THE WILDLIFE FIELD—David B. Turner—*American Nature Association and the Wildlife Management Institute,* 208 p., paper, $1.00

REGULAR POLYTOPES—H. S. M. Coxeter—*Methuen,* 321 p., illus. $10.09 approx. For mathematicians and enthusiasts on mathematics. If you are curious about the mathematics of the familiar toy, the kaleidoscope, you will find much to your taste here.

REPTILE AND AMPHIBIAN TRACKWAYS FROM THE LOWER TRIASSIC MOENKOPI FORMATION OF ARIZONA AND UTAH—Frank E. Peabody—*University of California Press,* 467 p., illus., paper, $3.50. Study of the trackways has provided much information about animals long extinct.

THE ROLE OF SCIENTIFIC RESEARCH IN HUMAN RELATIONS—William A. Hamor—*Mellon Institute,* 4 p., paper, free upon request direct to Mellon Institute, University of Pittsburgh, Pittsburgh 13, Pa.

SCIENCE AT WAR—J. G. Crowther and R. Whiddington—*Philosophical Library,* 185 p., illus., $6.00. Written by a team of well-known British journalist and physicist, this tells the story of the contribution of British scientists toward winning the war.

A TREASURY OF *SCIENCE*—Harlow Shapley, Samuel Rapport and Helen Wright, Eds.—*Harper,* enlarged ed., 272 p., $4.50. Selections from well-known writers especially for the general reader. The new edition contains an extension of the selection from Jeans on "Exploring the Atom" as well as some new contributions on atomic energy.

YOU MUST RELAX: A Practical Method of Reducing the Strains of Modern Living—Edmund Jacobson—*McGraw-Hill,* 3d ed., 282 p., illus., $2.75. Understandable instructions on how to get rid of nervous and muscular tensions when you are "keyed up."

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⚙ *HAND TOOL, operating with blank cartridges, drives metal studs into wood, concrete or steel with a great saving in time over former methods. The cartridges are fastened to the end of the studs, which become imbedded so solidly that they will support a weight of several tons, it is claimed.*

Science News Letter, December 4, 1948

⚙ *HOLDING TAPE, to hold a man's shirt inside his trousers or a woman's blouse within her slacks, is a strip of neoprene sponge rubber with a backing of cotton tape so that it can be easily stitched inside the waistband. This synthetic product does not soften and become sticky from perspiration and body oils.*

Science News Letter, December 4, 1948

⚙ *TEST OVEN, combining the advantages of both infrared and convectional heating, was developed to establish standards for the baking of organic finishes and to discover new uses for infrared heating. As shown in the picture, the infrared lamps are arranged in six adjustable banks*

with regulators to allow variation in the voltage used.

Science News Letter, December 4, 1948

⚙ *ASPHALT remover quickly and efficiently digs out, by a revolving cutting wheel, old asphalt from expansion joints in concrete paving. Guided by plow handles, the rubber-tired, gasoline-power device has exchange cutters for joints of different widths, and it has a pick-up unit to gather the waste material.*

Science News Letter, December 4, 1948

⚙ *PHOTOCOPY finishing equipment, made of hard rubber and fitted with a lid, puts an end to the bother of mixing chemical solutions, then storing them again every time after prints are made. Solutions may remain in these tanks for months, protected from light, dust and evaporation by the lids.*

Science News Letter, December 4, 1948

⚙ *TWO-WAY communication set, developed in England, allows a mother to work indoors and hear the baby in an outdoor playpen. It operates from two ordinary flashlight batteries, and is worked by pressing a lever to speak and releasing it to hear. The portable receivers are placed one near mother and one near the child.*

Science News Letter, December 4, 1948

• Do You Know? •

Spareribs and sauerkraut are as American as baked beans.

American farmers are spending three times as much now for *medical care* as they were a decade ago.

High-strength *copper alloys* include manganese bronze, silicon bronze, and certain so-called white brasses sometimes called nickel silver.

A small amount of *calcium chloride*, added to the water in which apple slices are soaked prior to freezing or canning, makes slices that retain their shape and firmness when baked in pies.

An *ancient city* in Colombia, South America, recently excavated, had over 3,000 houses, according to the foundations unearthed; it was inhabited until shortly before the Spaniards came to the continent.

Scientists have resorted to blowing *soap bubbles* in an effort to find out what makes metals strong; soap bubbles have proven more useful than anything else tried in constructing a working model of a metal's crystal structure.

Several *copper-base alloys* have been developed that have an ultimate tensile strength rivaling that of steel.

A manganese shortage in *poultry feed* is said by poultry men to result in eggs of low hatchability.

A collection of some 2,000 *butterflies* from the remote Nyasaland region of Africa has been presented to the American Museum of Natural History, New York.

Rubber reclaiming, for reuse, is a big business in America; some 300,000 tons of the salvaged material are consumed in the United States each year.

In 1874, just 15 years after the first oil well was drilled in America, a Pennsylvania scientist estimated that the United States had enough *petroleum* to keep its kerosene lamps burning for only four years.

An *all-aluminum bridge* 504 feet from abutment to abutment is under construction in Quebec, Canada, which, it is said, will weigh 2,000 tons less than a similar bridge of steel; some bridges already in use are in part aluminum.

In 1947, *coffee* ranked first in value among imports into the United States, accounting for more than 10% of the total value of imports.

Sixteen Navy Seabees are spending the winter at Point Barrow, Alaska, living in a new type of *prefabricated house* designed to provide summer warmth in 65-below-zero weather and to withstand 150-miles-per-hour gales.

Science News Letter, December 4, 1948

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